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| (21) International Application Number: PCT/US99/30457 (22) International Filing Date: 20 December 1999 (20.12.99) (30) Priority Data: 09/218,833 22 December 1998 (22.12.98) US (71) Applicant: ERICSSON INC. [US/US]; 7001 Development Drive, P.O. Box 13969, Research Triangle Park, NC 27709 (US). (72) Inventors: WOO-SAM, Jerry; 2081 Deer Haven Drive, Chino Hills, CA 92709 (US). LEE, Allen; 3037 Cardillo Avenue, Hacienda Heights, CA 91745 (US). (74) Agents: MOORE, Stanley, R. et al.; Jenkins & Gilchrist, P.C., Suite 3200, 1445 Ross Avenue, Dallas, TX 75202 (US). | | (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> |
| (54) Title: AUTOMATIC CONFERENCE CALL SYSTEM AND METHOD (57) Abstract An automatic conference call telephone system is disclosed. Upon receipt of a list of telephone numbers corresponding to desired participants of the conference call, the system automatically dials each telephone number in the list. Upon a telephone call to a desired participant being answered, the answered telephone call is directed to the requesting party of the conference call. The requesting party, after determining whether the corresponding conference call participant has answered the telephone call, may instruct the system to bridge the telephone call into the call conference. Because the requesting party assumes a limited role in establishing the conference call, the requesting party is provided more opportunity to communicate with those conference call participants who have already been bridged into the conference call. | | |

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AUTOMATIC CONFERENCE CALL SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

Technical Field of the Invention

5 The present invention relates, generally, to a system and method for establishing a conference call, and particularly to automatically establishing a conference call within a telephone network.

Background and Objects of the Invention

10 The development of modern telephony has made available a number of services for a telephone service subscriber. One such telephone service is call conferencing. Call conferencing allows three or more telephone subscribers to participate in a single conversation over a telephone network by the establishment of a speech connection between the participating subscribers. Existing call conferencing systems typically require the caller initiating the conference call (the "conference leader") to manually
15 dial and re-dial each number of the participating subscribers in order to establish a speech connection therewith. Because existing conference call systems require substantial involvement by the conference leader, the conference leader is unable to effectively communicate with the conference call participants who are already conferenced in while the remaining conference call participants are being contacted.
20 In addition, establishing a conference call with one or more overseas participants may take a considerable period of time. Consequently, the amount of time the conference leader is unable to communicate with the participants may be quite considerable when overseas participants are involved. Although telephone features such as automatic redial and/or preprogrammed telephone numbers facilitate the establishment of a
25 conventional conference call, the conference leader nonetheless remains substantially involved in establishing a conference call. As a result, there exists a need for an improved conference call system and method in which the conference leader is alleviated of much of the tasks involved in establishing a conference call.

30 It is an object of the present invention to provide a telephone system and method which facilitates the establishment of a conference call within a telephone network.

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It is another object of the present invention to provide a conference call system and method for substantially automatically establishing a conference call.

Another object of the present invention to provide such a system and method which allows conference call participants to communicate with each other while speech
5 connections to other participants are being created.

SUMMARY OF THE INVENTION

The present invention overcomes the above-discussed shortcomings and establishes a significant need for an improved system and method for establishing a
10 conference call. The present invention may include software and circuitry employed as a part of an overall system which provides telephone services. The present invention includes software and circuitry located within the telephone system's switching circuitry and the telephone of the conference call leader in order for each intended conference call participant to be automatically contacted and selectively added to the conference
15 call.

The method of automatically establishing a conference call, according to the present invention, includes the system initially receiving a request from the conference leader to establish a conference call and a list of telephone numbers of the conference call participants. Next, the present system automatically sequentially
20 dials each number from the conference call participant list. If a telephone call corresponding to a dialed telephone number is answered, then the conference leader is alerted to the telephone call answer. Upon determining that the intended conference call participant answered the telephone call placed by the system, the conference leader may instruct the system to bridge the answered telephone call into the
25 conference call.

In the event the conference leader determines that someone other than the intended conference call participant answered the telephone call, the conference leader may instruct the system to skip the inclusion of the intended conference call participant in the conference call. Upon being instructed to skip the intended conference call
30 participant, the present system will cease further attempts to reach the intended conference call participant and include the participant in the conference call.

In the event the line of a conference call participant is busy or otherwise cannot

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be reached by the present system, the present system will automatically redial the corresponding telephone number at a later time, such as after an attempt has been made to reach the remaining conference call participants. Optionally, the conference leader may instruct the present system to refrain from further attempting to add the intended conference call participant to the conference call.

During the time the present system is automatically attempting to reach the conference call participants identified by the conference leader, the conference leader is free to engage in conversation with those conference call participants who have been added to the conference call. As a result, the involvement by the conference leader in establishing the conference call is substantially minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the system and method of the present invention may be obtained by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings wherein:

Figure 1 is a schematic block diagram of a telecommunications systems having automatic call conferencing, according to the present invention; and

Figures 2A and 2B are flow charts illustrating the operation of the automatic conference call service according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EXEMPLARY EMBODIMENTS

The present invention will now be described more fully hereinafter with reference to the accompanying drawings in which a preferred embodiment of the invention is shown. This invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiment set forth herein. Rather, the embodiment is provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

Referring to Figures 1 and 2, there is shown a telecommunications system 1 according to the present invention, including one or more telephone switches 2 to which a plurality of telephones 3 are operatively connected. Switches 2 are employed to create circuits between two or more points, such as telephones 3, for

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communicating voice or other data therebetween, as is known in the art. It is understood that telecommunications system 1 may include other conventional telephone or communications-related equipment in order to provide telecommunications services to subscribers thereof. Telecommunications system 1 is
5 illustrated in Figure 1 as including only two switches 2 for reasons of clarity.

Telecommunications system 1 preferably further includes at least one telephone 4 which is adapted for use in initiating a conference call. Telephone 4 includes base component 5 having keypad 6 for providing data to telecommunications system 1. Keypad 6 may include alphanumeric keys 6A as well as function keys 6B-6D. In a
10 preferred embodiment of the present invention, activation of a first function key 6B preferably causes telephone 4 to transmit a code to telecommunications system 1 to initiate a conference call. Alternatively, a combination of alphanumeric keys 6A may be activated to initiate the conference call. Keypad 6 preferably includes a second function key 6C which, when activated, connects a telephone 3 into a conference call
15 speech connection, as explained below. Keypad 6 may further include function key 6D which, when activated, causes the disconnection of an established speech connection to a telephone 3.

Telephone 4 preferably further includes display 7 and associated circuitry (not shown) for displaying communication information. In particular, display 7 presents
20 status information to a user of telephone 4 regarding the connection of conference call participants to a requested conference call, as explained below.

Telephone 4 is preferably capable of transmitting a list of telephone numbers to telecommunications system 1 corresponding to the conference call participants the conference leader intends to contact and include in the conference call. The list of
25 telephone numbers, for example, may be entered into memory 8 of telephone 4 using keypad 6. The stored list of telephone numbers may be maintained in memory 8 until its transmission to telecommunications system 1. The storage of a telephone number list is especially convenient for instances in which the same individuals participate in call conferences on a regular basis.

30 The present invention preferably allows the user of telephone 4 to maintain a plurality of distinct lists of telephone numbers. For example, each list of telephone numbers pertaining to a conference call may be maintained and/or accessed by

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activating a distinct key on keypad 6.

The operation of the present invention in automatically establishing a conference call between a plurality of participants is illustrated in Figures 2A and 2B. The conference leader initiates a conference call at step 20 by dialing a special conference access code and/or activating an assigned key on keypad 6. Next, the conference leader, using telephone 4, may transmit during step 21 the desired list of telephone numbers of conference call participants the conference leader intends to include in the conference call, by activating the appropriate key on keypad 6. This key activation may be in response to telephone 4 prompting the conference leader, via display 7, to select a list from the stored lists of telephone numbers in telephone 4. The system then verifies that it has received the selected list of telephone numbers from the conference leader at step 22, and that the necessary hardware and software for establishing a conference call are available within switch(es) 2 and telephone 4 at step 23.

Upon an affirmative determination that the selected list of telephone numbers and necessary hardware/software are available, telecommunications system 1 preferably selects an idle trunk and reserves conference call circuitry within switch(es) 2 at step 24. Next, telephone 4 (the telephone which was employed to initiate the conference call by the conference leader) is connected to the selected trunk at step 25, whereupon telephone 4 is capable of being in speech communication with the other conference call participants as the participants are connected to the selected trunk.

Thereafter, a switch 2 of the present system preferably automatically dials each telephone number from the list of conference call participant telephone numbers transmitted by telephone 4 during step 21. In a preferred embodiment of the present invention, the present system sequentially dials the telephone numbers from the list of telephone numbers, such as dialing the telephone numbers in the order in which the numbers were originally stored in the list in telephone 4. Referring to Figure 2B, telecommunications system 1 dials a first telephone number from the list at step 30. If the telephone 3 connected to the telephone line corresponding to the first telephone number goes off-hook at step 31, then the conference leader is alerted of the answered call at step 32.

The conference leader, for example, may be alerted by switch 2 directing the

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answered telephone call to telephone 4 of the conference leader as a second telephone call and providing a call waiting indication thereto. Responsive to the call waiting indication, the conference leader may temporarily interrupt his existing speech connection with the trunk selected for providing the conference call and answer the second telephone call. At this time, the conference leader is capable of determining whether or not the intended conference call participant answered the dialed telephone call. In the event the intended conference call participant answered the telephone call dialed by system 1 and thus is available to be conferenced into the conference call, the conference leader selectively bridges the second telephone call into the selected trunk which provides the conference call connection, by activating function key 6C. Thereafter, the successfully-reached conference call participant and the conference leader are both connected into the conference call connection at step 33. System 1 then commences dialing the next telephone number from the list of telephone numbers and repeats the above-described steps in order to connect the next conference call participant into the conference call.

In the event it is determined by the conference leader that the intended conference call participant did not answer the telephone call dialed by system 1, then the conference leader may eliminate the participation of the conference call participant from the conference call at step 34. The conference leader may determine, for example, that an answering machine, voicemail system or another party answered the telephone call initiated by system 1 instead of the intended conference call participant. If the conference leader elects to cancel the intended conference call participant from participating in the conference call, the conference leader may activate function key 6D at step 34 which disconnects the speech connection to the participant's telephone line and returns the conference leader to the conference call trunk connection. System 1 will not redial the corresponding telephone number and will commence dialing the next telephone number from the list.

In the event the telephone call placed by system 1 is busy or cannot otherwise be answered, switch 2 will automatically redial the corresponding telephone number at step 35 at a later time, such as following attempts to dial the remaining telephone numbers on the list provided by the conference leader. Switch 2 may redial the telephone number as many times as may be specified by the conference leader when

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initiating the conference call during steps 20 and 21. Further, the conference leader may cancel the redialing operation of step 35 by activating function key 6D, which cancels further attempts to include the corresponding conference call participant in the conference call.

5 As explained above, display 7 of telephone 4 preferably allows the conference leader to monitor the automatic dialing and redialing operation performed by switch 2. In particular, display 7 preferably visually presents information to the conference leader while the conference leader is in speech communication with those conference call participants who are already connected into the conference call. In this way, the
10 conference leader may continue to communicate with the connected conference call participants and selectively leave the conference call only when the conference leader considers it necessary. Accordingly, display 7 is updated with information during, among other steps, steps 30 and 31.

15 The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method of establishing a conference call, comprising the steps of:
receiving an instruction from a first telephone to initiate a conference call;
5 receiving a list of a plurality of telephone numbers from said first telephone,
each telephone number in said list corresponding to a conference call participant;
automatically dialing each telephone number in said list;
determining whether a telephone call to each said telephone number dialed is
answered; and
10 selectively bridging an answered telephone call into said conference call.
2. The method of claim 1, wherein said determining step further comprises
the step of:
alerting a user of said first telephone of an answered telephone call.
15
3. The method of claim 2, wherein said alerting step comprises the step
of:
alerting a user of said first telephone of each answered telephone call to said
dialed telephone numbers.
20
4. The method of claim 1, wherein said determining step further comprises
the step of:
directing said answered telephone call to said first telephone; and
indicating to a user of said first telephone of said answered telephone call being
25 directed thereto.
5. The method of claim 4, wherein said indicating step comprises the step
of:
activating a call waiting indicator on said first telephone.
30
6. The method of claim 1, further comprising the step of:
storing said list of telephone numbers prior to said list receiving step.

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7. The method of claim 1, wherein said selectively bridging step comprises the steps of:

receiving an indication from said first telephone to bridge said answered telephone call into said conference call; and

5 bridging said answered telephone call into said conference call in response to said received indication.

8. The method of claim 1, further comprising the step of:
selectively disconnecting said answered telephone call.

10

9. The method of claim 8, further comprising the step of:
receiving an indication from said first telephone to disconnect said answered telephone call, said disconnecting step being responsive to said indication receiving step.

15

10. The method of claim 1, further comprising the step of:
automatically redialing a first telephone number from said list of telephone numbers upon an affirmative determination of a telephone call to said first telephone number being unanswered during said step of automatically dialing.

20

11. The method of claim 10, further comprising the step of:
receiving a maximum number of times a telephone number from said list of telephone numbers can be redialed.

25

12. The method of claim 1, wherein:
said dialing step sequentially dials each said telephone number from said list.

30

13. The method of claim 1, further comprising the steps of:
selecting a telephone line for said conference call; and
connecting said first telephone to said selected telephone line prior to said bridging step, said bridging step bridges said answered telephone call to said telephone line.

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14. The method of claim 1, further comprising the step of:
monitoring said dialing step from said first telephone.

15. A telecommunications system, comprising:
5 a first telephone, including circuitry for generating and transmitting a list of
telephone numbers corresponding to participants for a conference call;
a telephone switching system coupled to said first telephone, comprising:
receiver circuitry for receiving said participant list;
dialing circuitry for automatically dialing each telephone number in said
10 list; and
sensor circuitry for detecting whether a telephone call to each dialed
telephone number is answered; and
bridging circuitry for selectively bridging an answered telephone call into said
conference call.

16. The system of claim 1, further including:
alerting circuitry for alerting a user of said first telephone of said answered
telephone call.

17. The system of claim 15, wherein:
said telephone switching system directs said answered telephone call to said
first telephone; and
said first telephone indicates to a user thereof of said answered telephone being
directed to said first telephone.

18. The system of claim 15, wherein:
said first telephone includes memory and circuitry for storing said telephone
numbers as a list in memory.

19. The system of claim 15, wherein:
said first telephone includes memory and associated circuitry for storing a
plurality of lists of telephone numbers, each list of telephone numbers corresponding

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to a list of participants for a distinct conference call.

20. The system of claim 15, wherein:

5 said first telephone includes circuitry for generating and transmitting a bridging indication to said telephone switching system to bridge said answered telephone call into said conference call; and

said bridging circuitry bridges said answered telephone call into said conference call in response to said bridging indication.

10 21. The system of claim 15, wherein:

said dialing circuitry automatically redials a first telephone number from said list of telephone numbers upon an affirmative determination of a telephone call to said first telephone number being previously unanswered.

15 22. The system of claim 15, wherein:

said dialing circuitry sequentially dials each said telephone number from said list.

23. The system of claim 15, wherein:

20 said telephone switching system selects a telephone line for said conference call; and

said bridging circuitry connects said first telephone to said selected telephone line prior to said bridging circuitry bridging an answered telephone call to said conference call.

25

24. The system of claim 15, wherein:

said first telephone includes circuitry for displaying information regarding said telephone number dialing by said telephone switching system.

30 25. A method of establishing a conference call between a plurality of telephones, said method comprising the steps of:

receiving a list of telephone numbers, each said telephone number

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corresponding to a conference call participant;

automatically attempting to establish a speech connection with telephones
corresponding to said telephone numbers in said list;

5 automatically indicating to a conference leader a status of said automatic
speech connection attempts;

receiving a response from the conference leader regarding said status; and

selectively connecting a plurality of established speech connections to said
conference call based upon said received response.

10 26. The method of claim 25, further comprising the step of:
connecting the conference leader to said conference call prior to said automatic
indicating step.

15 27. The method of claim 25, wherein said automatic indicating step
comprises the steps of:

individually directing said established speech connections to the conference
leader; and

alerting the conference leader of said established speech connections being
directed thereto.

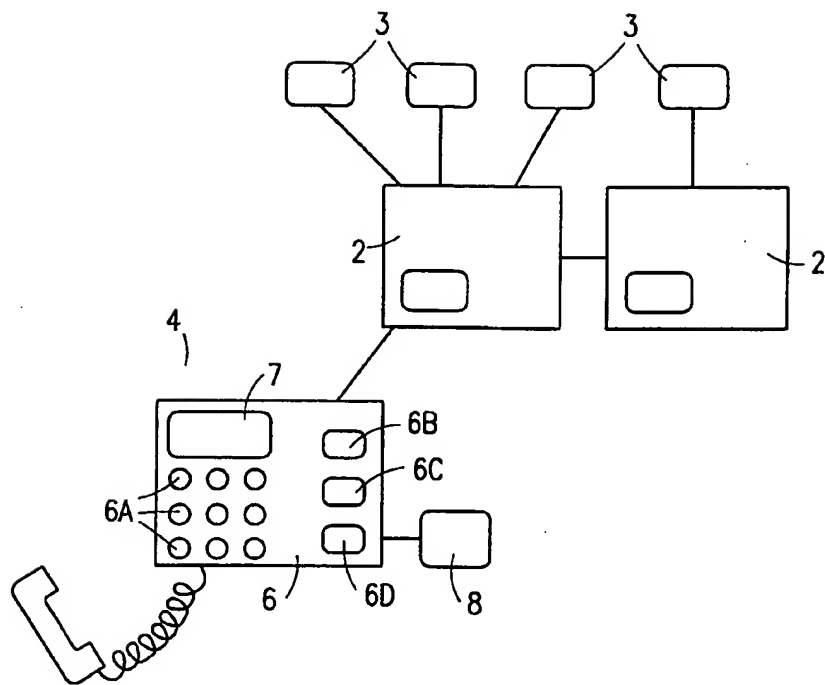
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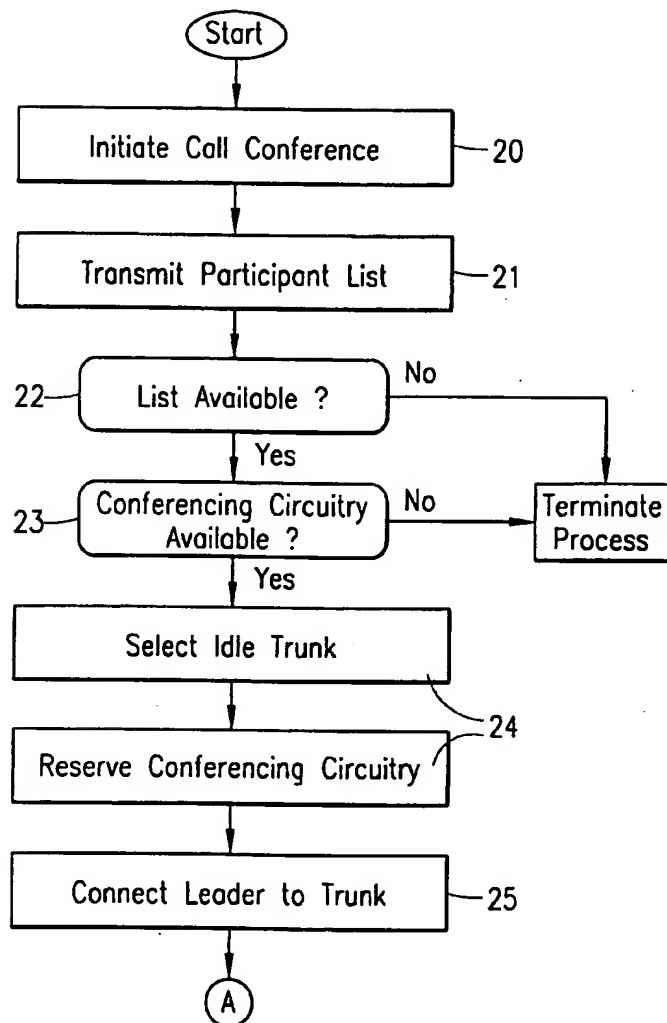
28. The method of claim 25, further including the step of:

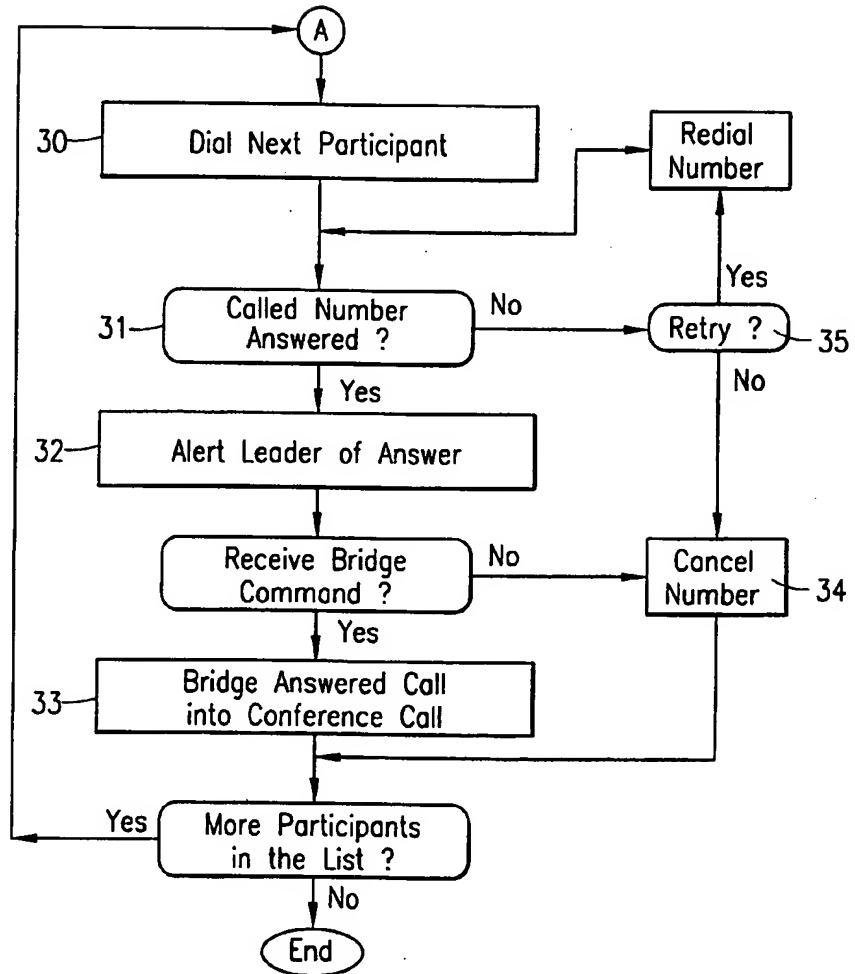
selectively disconnecting an established speech connection in response to said
received response from the conference leader.

25 29. The method of claim 25, wherein:

said automatic attempting step attempts to establish speech connections with
said telephones sequentially.

**FIG. 1**

**FIG. 2A**

*FIG. 2B*

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/30457

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M3/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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24/03/2000

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
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